Implementing Low Carbon Public Transport in Jakarta Project

Photo : Adjie Triwibowo

Renewable Energy & Energy Efficiency Project (REEEP)
Project ID 108010494

Report 2
Route Design and Operational Design for Direct Service for Transjakarta

March 2012

ITDP | Institute for Transportation & Development Policy
Promoting sustainable and equitable transportation worldwide.

Outline

1. Direct Service Concept
2. Route Selection
3. Demand Estimate
4. Business Model
    a. Payment System
    b. Operator Payment
    c. Financial Scheme for Direct Service
5. Transition Scheme
6. Fleet Specification
7. Implementation Phase

24 Transjakarta Routes in 11 Corridors

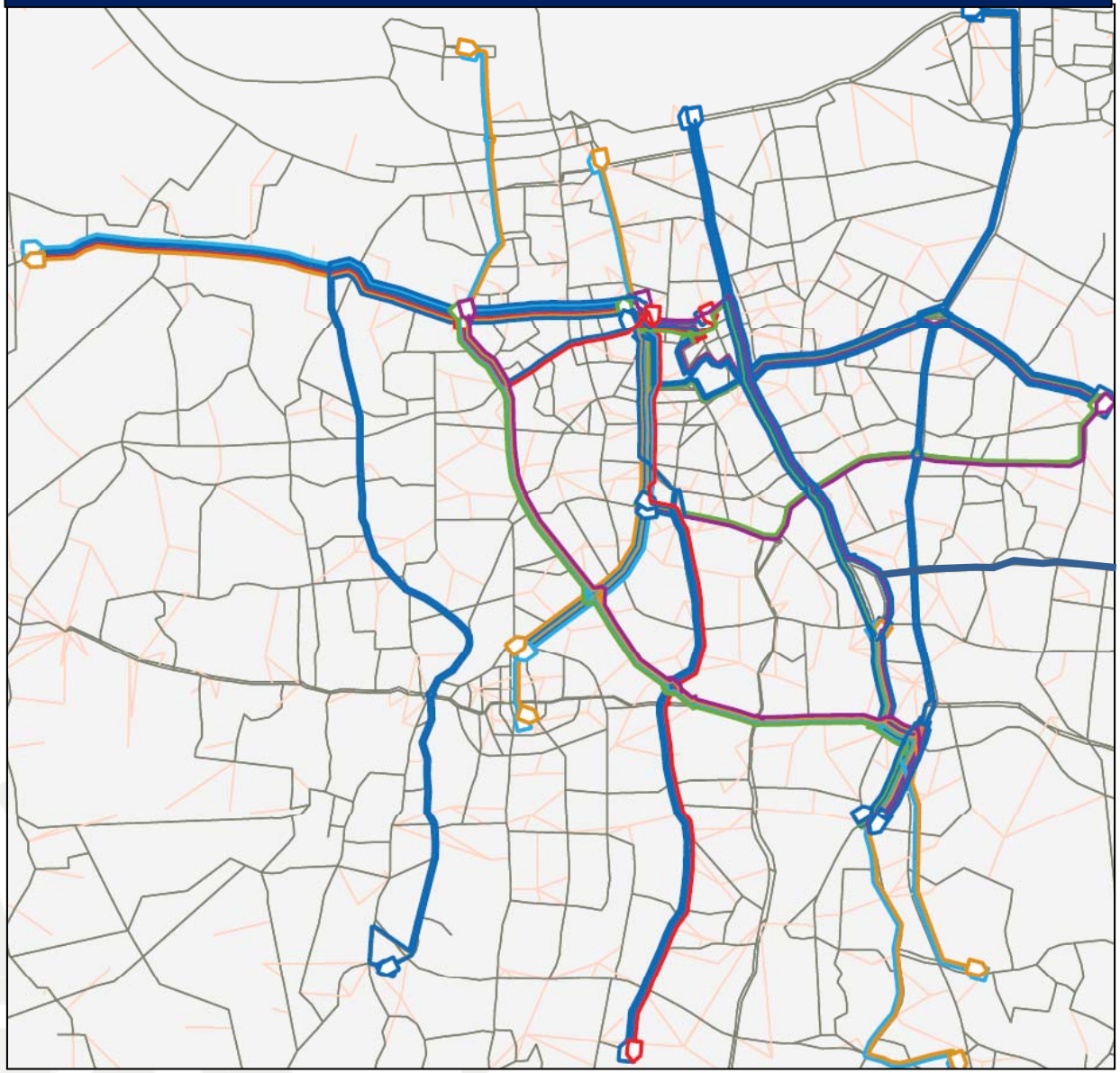
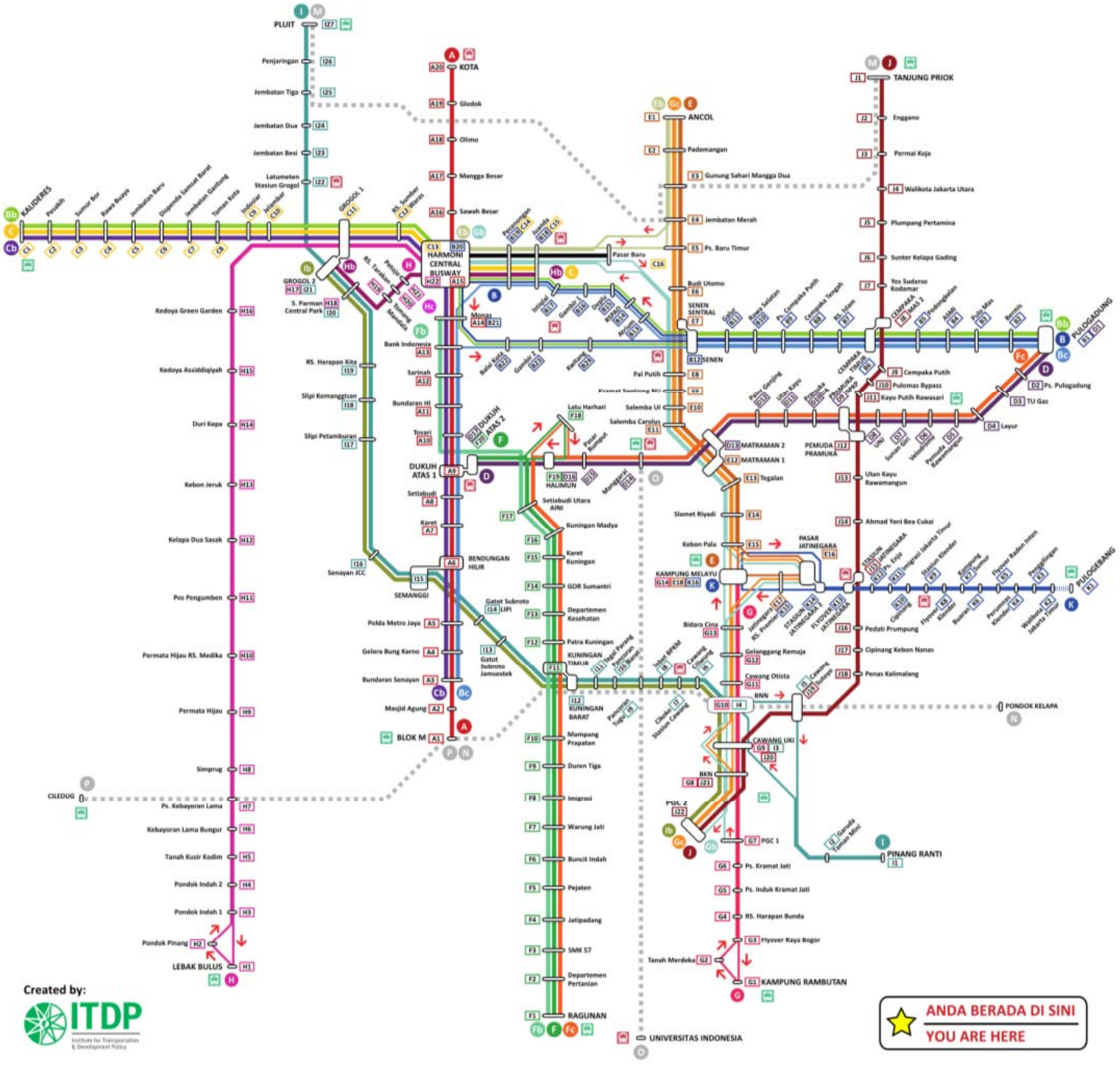


Fig 1– Transjakarta Route as per March 2012

List of 24 Transjakarta Routes :

1. Blok M – Kota
2. Blok M - Harmoni
3. P Gadung – Harmoni
4. P Gadung – Kalideres
5. P Gadung – Bunsen
6. Kalideres – Harmoni
7. Kalideres - Bunsen
8. D Atas - P Gadung
9. Ancol - Kp Melayu
10. Ancol - Harmoni
11. Ragunan - D Atas
12. Ragunan – Monas
13. Ragunan – P Gadung
14. Rambutan – Melayu
15. PGC – Harmoni
16. PGC – Ancol
17. Lebak Bulus – Grogol
18. Lebak Bulus - Tomang
19. Kebayoran – Harmoni
20. Grogol - Harmoni
21. Pinang Ranti – Pluit
22. PGC – Grogol
23. PGC – Priok
24. Melayu - P Gebang

Transjakarta Network



Direct Service Concept

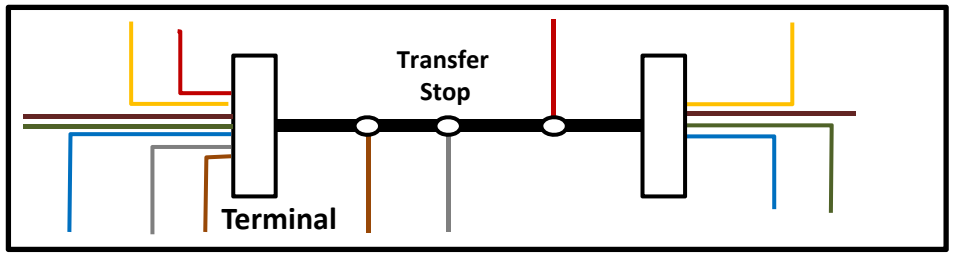


Fig 2 – Separate Trunk & Feeder Service

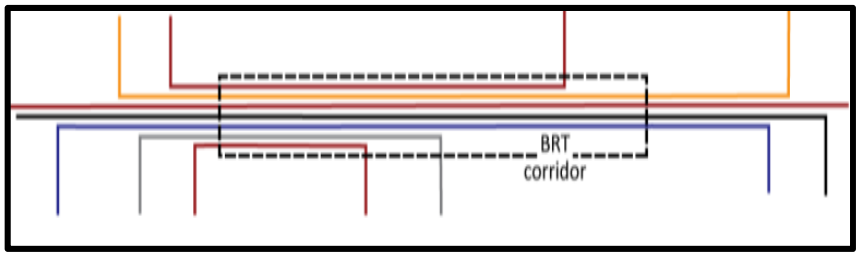


Fig 2 – Direct Servuce Concept

Direct Service Concept is introduced to minimze transfer for passengers from the feeder to trunk service.

With Separate Trunk and Feeder Concept (shown in Fig 1). Passengers have to transfer from one service to another at the end terminal. Some drawbacks of this system in Jakarta are as follow:

1. Great distance between the feeder alighting area and trunk service boarding area.
2. Long walking time is required to make transfer
3. Long waiting time on the trunk services
4. Entrance for bus to enter the terminal are normally blocked by other buses waiting to get passengers

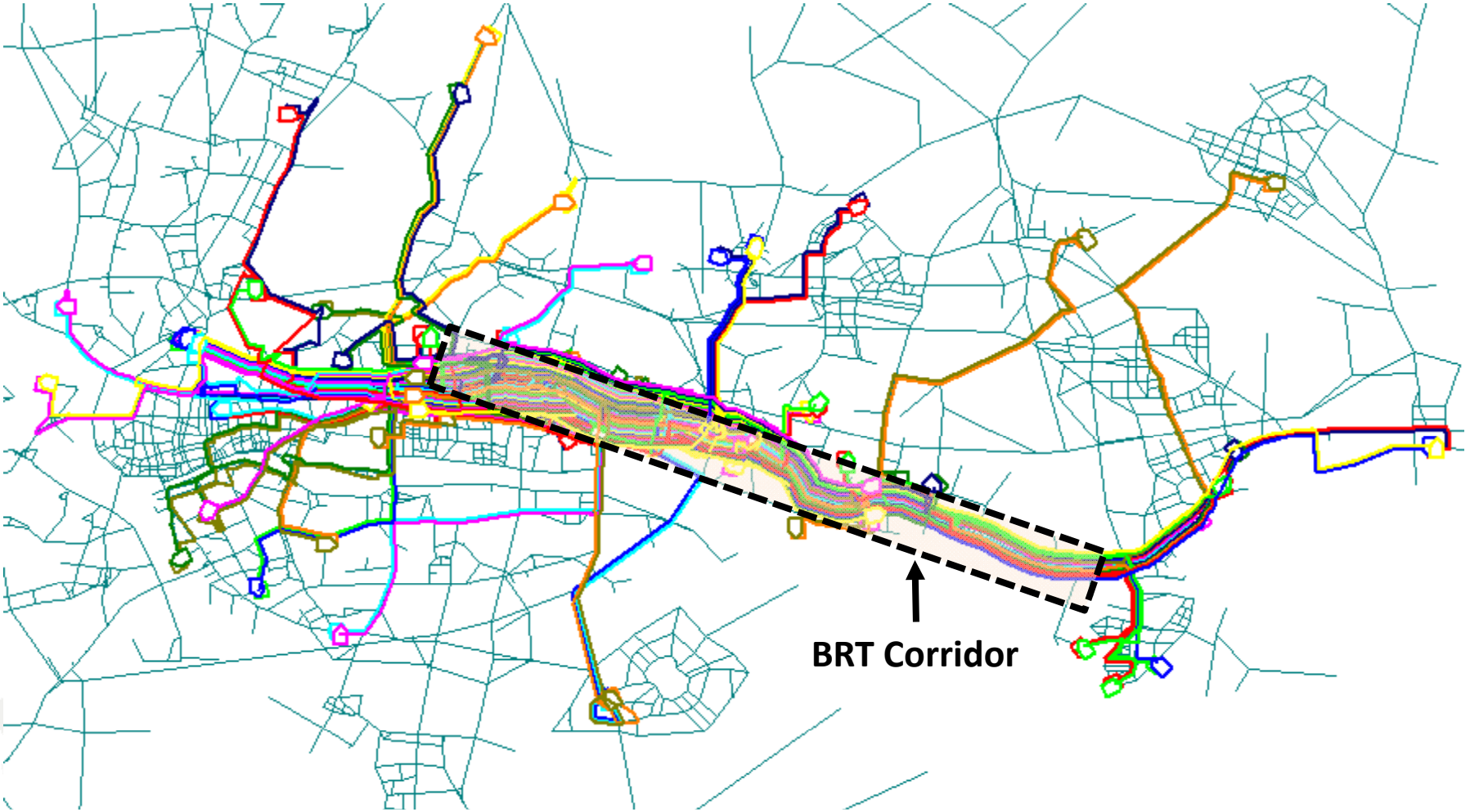
With Direct service concept, transfer time at terminal can be eliminated, which eventually save passenger travel time.

Direct service buses will be allowed to enter Transjakarta lane and stop at the Transjakarta station, ensuring full integration with Transjakarta services.

If implemented, this system will create the following benefit for Transjakarta :

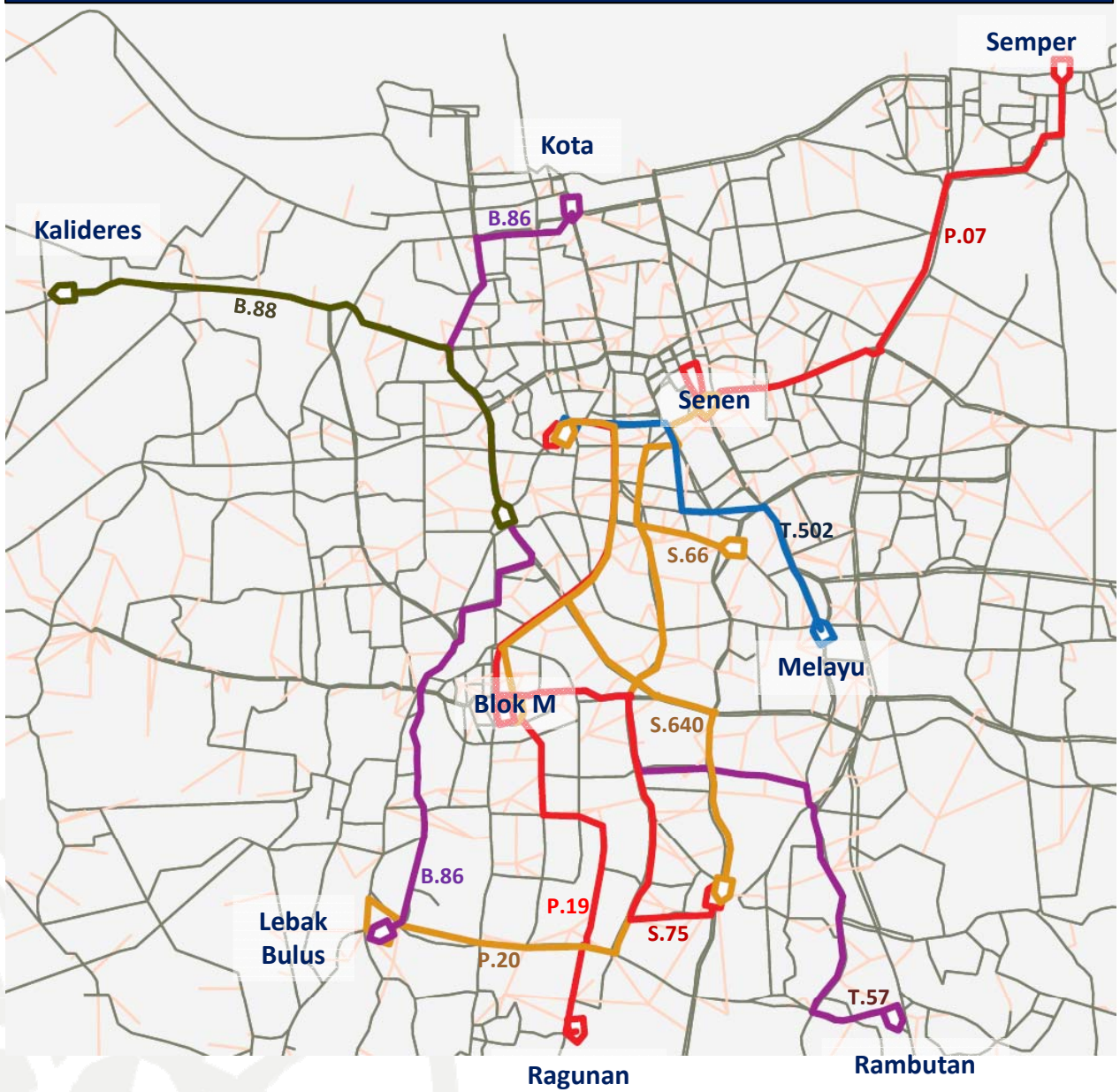
1. Increased Bus Frequency on Corridor
2. Bigger catchment area for Transjakarta
3. Adding Passengers from Direct service

Direct Service Example in Guangzhou



In Guangzhou, with direct service, BRT bus can operates at non-BRT corridor. There are 31 BRT routes, all direct service, which are concentrated along 23 km BRT Corridor and in total serving the total network of 273 km.

Metromini and Kopaja Corridor with Potential for Direct Service



There are 10 High Frequency Metromini and Kopaja Routes which have overlap section with Transjakarta corridors, which are:

1. B.86 (Lbk Bulus – Kota)
2. B.88 (Kalideres – Slipi)
3. P.07 (Semper – Senen)
4. P.19 (Ragunan – Tn Abang)
5. P.20 (Lbk Bulus – Senen)
6. T.57 (Rambutan – Blok M)
7. T.502 (Melayu – Tn Abang)
8. S.66 (Manggarai – Blok M)
9. S.75 (Ps Minggu – Blok M)
10. S.640 (Ps. Minggu – Tn Abang)

Direct Service Route Selection

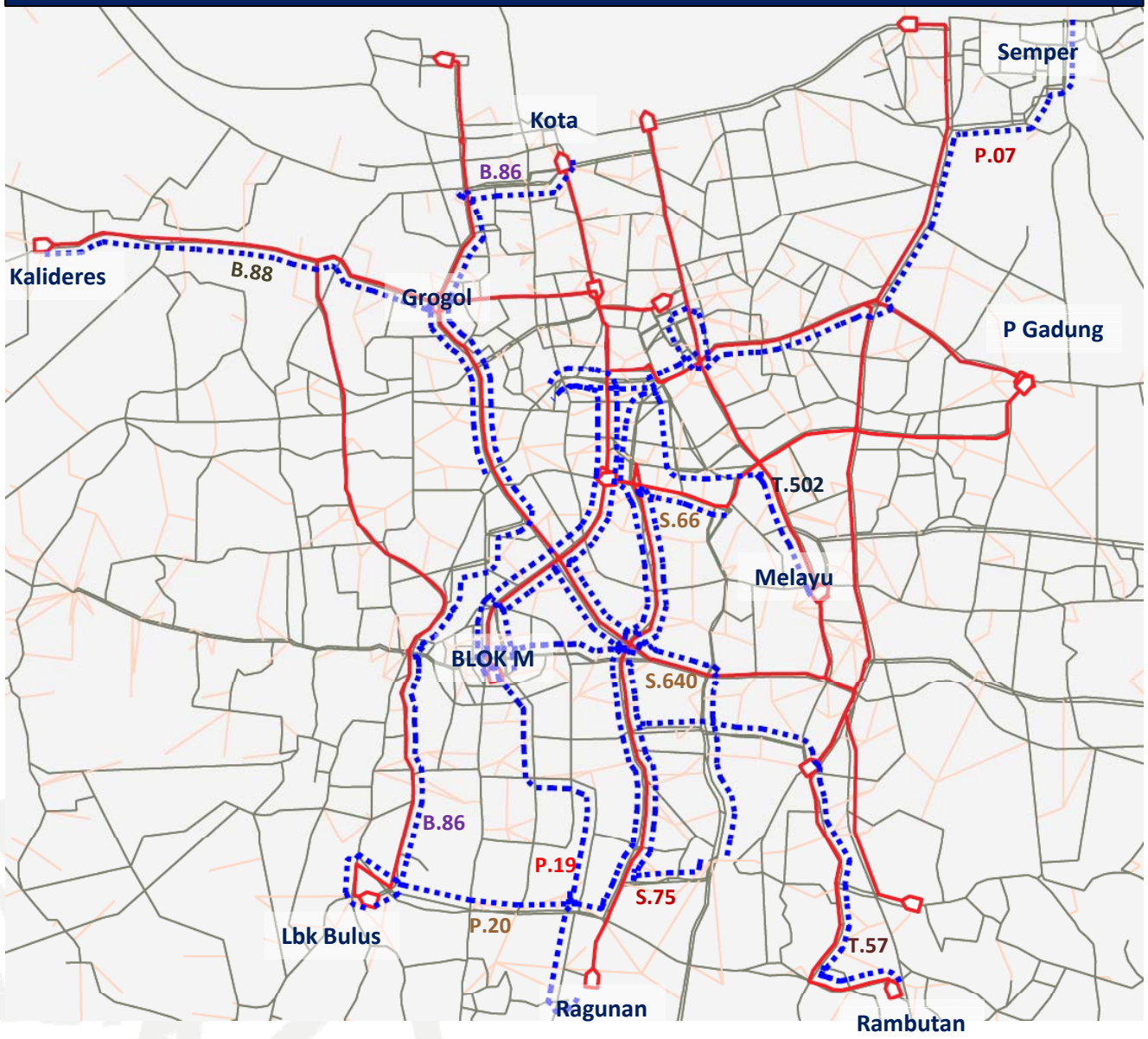


Fig 2– Trunk Line and Direct Service Routes

By Implementing Direct Service routes, Transfer at station can be minimized, thus allowing faster journey time for passengers.

With Direct Service Concept, buses can operate along Transjakarta Corridor and stops at BRT Station. This concept is estimated to increase system capacity by 50%.

There are currently 10 regular service routes identified as potential routes for Direct Service Transjakarta. These high-frequency and high-occupancy service also have high percentage of overlap with existing Transjakarta corridors.

Existing Condition
Frequency, Fleet Size and Passengers

No	Route Code	Routes	Overlap	METROMINI/KOPAJA			TRANSJAKARTA	
				Freq/hr	Pax/hr	Fleet Size	Freq/hr	Pax/hr
1	S 640	Tn Abang – Ps Minggu	12%	61	1286	115	32	1862
2	P 19	Tn Abang - Ragunan	16%	69	1005	63	26	1626
3	T 502	Kp Melayu – Tn Abang	52%	29	977	68	40	3035
4	S 66	Manggarai – Blok M	29%	43	943	80	32	1862
5	P 07	Senen – Semper	16%	34	730	82	29	2045
6	T 57	Kp Rambutan – Blok M	29%	22	520	81	12	790
7	P 20	Senen – Lebak Bulus	16%	24	514	99	33	2246
8	B 88	Kalideres – Slipi	64%	29	464	73	30	1494
9	S 75	Ps Minggu – Blok M	29%	25	355	162	26	2230
10	B 86	Lebak Bulus - Kota	64%	12	308	50	13	400

Routes selection was carried out by considering frequency, occupancy as well as the percentage route overlap with Transjakarta corridor.

As most of the routes still carry considerable number of passengers, by selecting those routes, Transjakarta will be easily getting additional passengers without the need to build new corridor and expand the network. The main purpose of this exercise is to look at the “high-demand” routes

For example, Route number S640 serving Ps Minggu – Tn Abang have high demand profile, with 1286 passengers still passing Transjakarta corridor overlapped with S640.

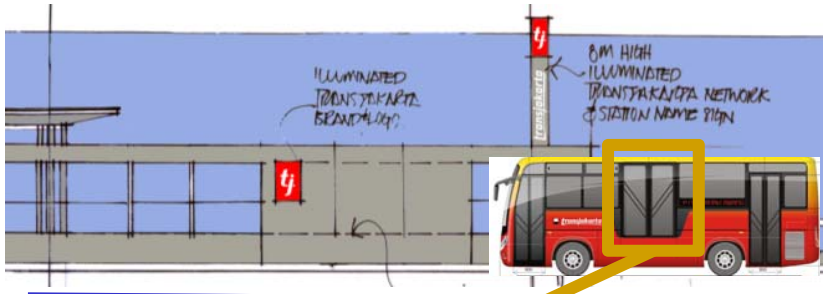
By having those additional passengers, Transjakarta will increase the number of passenger by 69% along that corridors from the S640 service

Transjakarta Capacity Increase

Lokasi	Rute	Regular Bus		TRANSJAKARTA				Direct Service + Transjakarta				Peningkatan Kapasitas Per Jam
		Frekuensi/ Jam	Okupansi (Pnp/Jam)	Frekuensi /Jam	Okupansi (Pnp/Jam)	Headway (Menit)	Kapasitas (Pnp/jam)	Frekuensi/ Jam	Okupansi/ Jam	Headway (menit)	Kapasitas (Pnp/Jam)	
Bunderan HI	S.640	26	410	45	2575	1.03	3825	108	3287	0.50	7135	45%
	P.19	37	302	45	2575							
Depkes	S.66	34	687	33	2246	1.82	2805	91	3447	0.66	4835	72%
	P.20	24	514	33	2246							
Gatsu Jamsostek	S.66	43	943	32	1862	1.88	4480	136	4091	0.44	8120	81%
	S.640	61	1286	32	1862							
Halimun	S.66	33	1013	42	2659	1.43	3570	75	3672	0.80	4725	32%
Mampang Prapatan	S.75	25	355	26	2230	2.31	2210	99	3365	0.61	4765	116%
	P.20	23	455	26	2230							
	T.57	25	325	26	2230							
Pasar Induk	T.57	22	520	12	790	5.00	1020	34	1310	1.76	1790	75%
Ps Cempaka Putih	P.07	34	730	29	2045	2.07	2465	63	2775	0.95	3655	48%
Setiabudi	S.640	69	1294	49	2870	1.22	4165	174	5735	0.34	8540	105%
	P.19	56	1571	49	2870							
Slamet Riyadi	T.502	29	977	40	3035	1.50	3400	69	4012	0.87	4415	30%
SMK 57	P.20	16	375	25	1735	2.40	2125	41	2110	1.46	2685	26%
Sunter Klp Gading	P.07	24	485	15	670	4.00	1275	39	1155	1.54	2115	66%

Operational Model

Section TRUNK



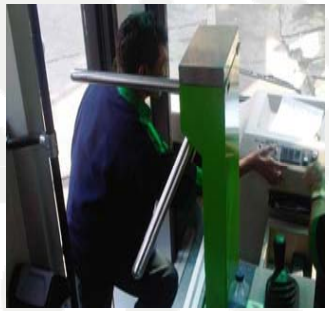
Access for Transjakarta Station

- No Additional fare for Passenger
- Free Transfer between Direct Service to other routes within Transjakarta station

Section OFF TRUNK

ENTRANCE

- Fare Rp 3500
- Payment On Board
- Revenue Handling byTransjakarta
- Smart Card Ticket
- Counter Turnstiles



EXIT

- Counter Turnstiles

Business Model

Option 1

- Operator Direct Service will be under contract with Transjakarta
- Business Scheme and Model are similar with the scheme for Transjakarta operator, with 7-10 year contract to operate the system, and paid per bus km travelled to cover the investment, vehicle operation and maintenance costs
- 1-tier ticket system (Rp 3,500 flat fare), where passengers can transfer for free as long as the transfer is made inside the Transjakarta station.
- Payment are made on board (during the Off – trunk Section) and collected by Transjakarta revenue collector on board. Whereas on the trunk section, payment are made before entering station.

Option 2

- Payment to operator are only made according to the kilometer bus travelled along the Trunk Corridor, whereas revenue collected during the OFF-Trunk corridor are managed by bus operators

Demand Estimate for Direct Service

Rute	Eksisting					Desain			
	Headway (mins)	Freq/hr	Pax/day	Revenue/ Bus/Day	Fleet Size	Max Load / hr	Headway Design (mins)	Freq/hr	Fleet Size Required
P.20	2.9	21	38,750	880,686	88	783	2.7	23	69
B.86	6.3	10	13,485	539,404	50	278	7.4	9	23
B.88	2.7	23	19,970	547,121	73	729	2.8	22	50
S.66	2.2	28	37,785	878,710	86	863	2.4	25	42
S.75	2.5	24	26,532	515,184	103	488	4.2	15	35
P.07	2.1	29	28,987	707,001	82	653	3.2	19	30
S.640	0.9	64	106,215	1,847,213	115	2320	0.9	67	125
T.502	2.9	21	20,242	595,367	68	676	3.1	20	24
T.57	2.9	21	37,727	931,533	81	624	3.3	19	48
P.19	1.4	42	52,826	1,677,024	63	1533	1.4	43	92
Total			382,519	Rp 911,924	809				539

Estimated number of passengers from direct service is **382,519 passengers per day**, with **average revenue per bus per day Rp 911,924**. This is a gross revenue before EBITDA and rent to vehicle owner

10 routes for direct service are selected by considering the peak hour passengers. By implementing direct service, number of fleet can be reduced from the existing **809 bus in operation to 539 buses for new and cleaner fleet** with 9 meter long.

Estimated Revenue and Operational Cost

Option 1 : Payment per km for all routes

Rute	Km Bus Travelled per day	Km Bus Travelled per year	Payment to Operator / bus / day	Payment to operator / Route / Month	Payment to Operator / Bus / Year	Payment to Operaor / route / Year	Revenue from Passenger / year
P.20	248	82,668	Rp 1,987,200	Rp 3,492,712,072	Rp 661,340,160	Rp 45,405,256,930	Rp 45,136,234,562
B.86	340	113,219	Rp 2,721,600	Rp 1,598,661,436	Rp 905,748,480	Rp 20,782,598,671	Rp 15,707,443,296
B.88	252	83,866	Rp 2,016,000	Rp 2,600,440,772	Rp 670,924,800	Rp 33,805,730,033	Rp 23,260,968,190
S.66	272	90,522	Rp 2,176,000	Rp 2,344,782,507	Rp 724,172,800	Rp 30,482,172,587	Rp 44,011,432,060
S.75	146	48,665	Rp 1,169,840	Rp 1,034,303,714	Rp 389,322,752	Rp 13,445,948,280	Rp 30,904,443,726
P.07	247	82,068	Rp 1,972,800	Rp 1,522,849,346	Rp 656,547,840	Rp 19,797,041,501	Rp 33,764,097,950
S.640	243	80,870	Rp 1,944,000	Rp 6,225,679,059	Rp 646,963,200	Rp 80,933,827,765	Rp 123,718,909,315
T.502	337	112,287	Rp 2,699,200	Rp 1,687,068,652	Rp 898,293,760	Rp 21,931,892,475	Rp 23,578,433,344
T.57	217	72,218	Rp 1,736,000	Rp 2,147,836,386	Rp 577,740,800	Rp 27,921,873,016	Rp 43,944,494,069
P.19	224	74,547	Rp 1,792,000	Rp 4,240,285,214	Rp 596,377,600	Rp 55,123,707,784	Rp 61,532,029,672
					Total	Rp 349,630,049,042	Rp 445,558,486,183

With 382,000 passengers per day, then if the fare is adjusted to Rp 3,500 per passenger, revenue from passenger would be Rp 445 billion per year. Preliminary estimate for payment to operator of Rp 8,000 per km would make the operational cost to run the buses is only Rp 350 billion per year, thus making the system able to run without government's subsidy

Transition Scheme

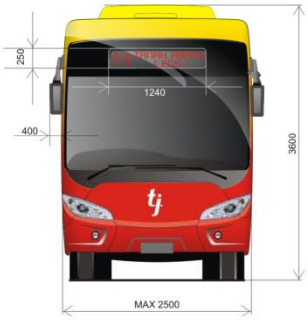
- To avoid resistance from existing bus operator (kopaja and metromini), It is recommended for the system to accommodate them
- Transition mechanism from the existing operator becoming part of the system can refer to the Transjakarta transition model, where open and competitive tender held simultaneously with the negotiation to the existing operators who are given the privillige to operate a share of buses. These existing operators are also required to form a so-called “partnership”, and scrap their existing old fleet to compensate the privilege given to them on the new direct service route.
- Governor Decree no 173/2010 have already regulate the procedure to select Transjakarta operators, which is applicable for the direct service as well.
- For fleet Scrapping, two options are proposed
  1. *Scrapping* armada with no monetary compensation (only given the privilege to operate new service), or
  2. Are compensated by the government (estimated at Rp 100 million per fleet)

Drawings

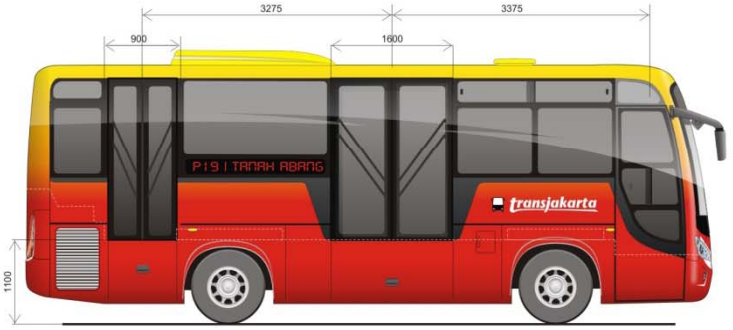
gambar aplikasi desain

AUTOMOTIVE & INDUSTRIAL DESIGN CONSULTANT furoda

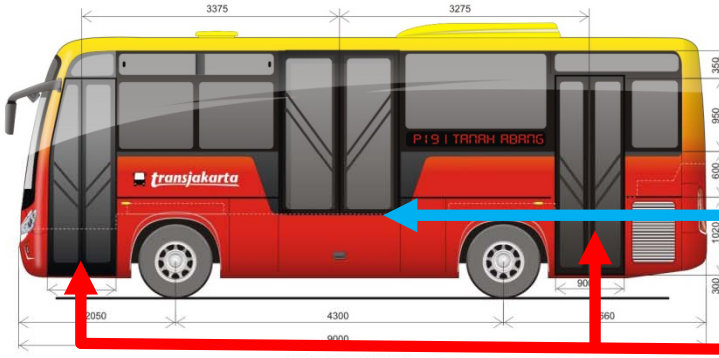
TAMPAK BELAKANG



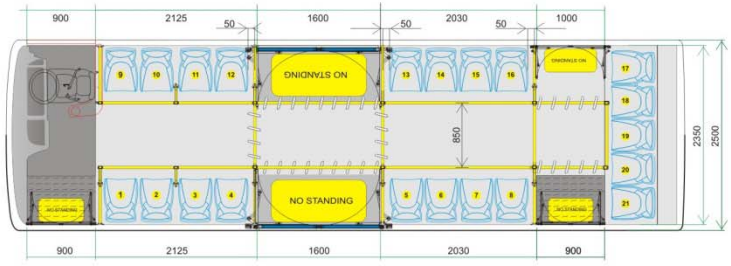
TAMPAK DEPAN



TAMPAK SAMPING KANAN



TAMPAK SAMPING KIRI



LAYOUT SEATS VIEW

Catatan:
Dimensi luar kendaraan hanya sebagai panduan. Batas yang diperbolehkan untuk dimensi kendaraan wajib mengacu ke dokumen spesifikasi teknis

LEGENDA

- Vertical Handrail
- Vertical rail ke ceiling
- Hand Grip
- Bi-Folding Door
- LED Display Samping
- LED Display Samping
- LED Display Belakang

Height 1100 mm

Height 300 mm

DIMENSION

Length : 9.000 mm
Width : 2.500 mm
High Floor Access Width : 1.600 mm
Low Floor Access Width: 800 mm

GAMBAR EKSTERIOR DESAIN FEEDER TRANSJAKARTA

Figure 4.6 Fleet Layout View

Date : May, 2012
Scale : Not to Scale
Unit : MM

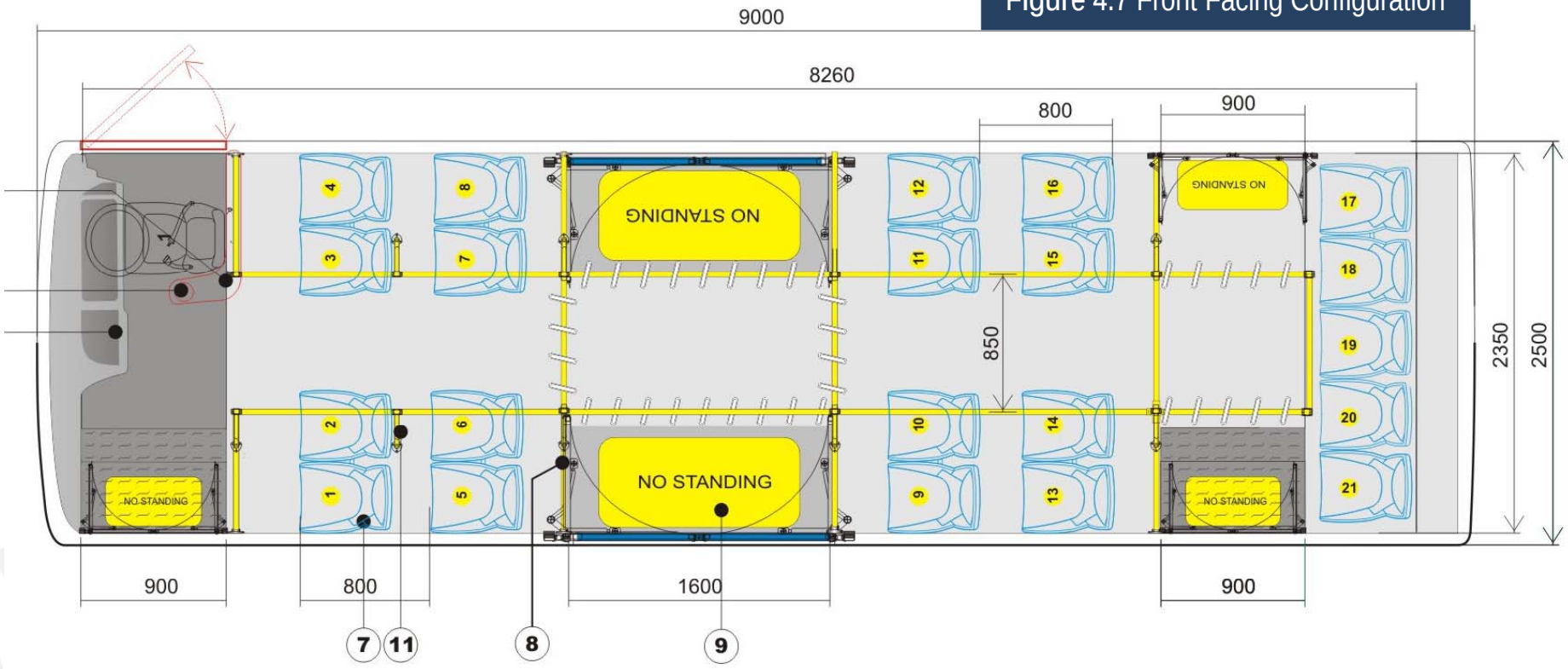
Digambar	furoda	TTD TGL 22/03/2011
Diperiksa	ITDP	TTD TGL
Disetujui	Ir. Udar Pristono, MT Kepala Dinas Perhubungan	TTD TGL

DINAS PERHUBUNGAN PROVINSI DKI JAKARTA

Seat Layout : Front Facing

No of Seats: 18
No of Standings: 20 - 24
Gap between Seats: 30 cm

Figure 4.7 Front Facing Configuration



With this concept, seats are reduced to provide more space for standing. This will allow bigger distance between passengers. The front facing configuration is already used in Kopaja and Metromini buses

Implementation Phase

- Implementation phase can be done per individual routes to make the communication and negotiation efficient
- Priority should be given on the corridor with low frequency of Transjakarta but with high demand profile for the direct service (for example corridor 1 and 6)
- Some recommended routes to be implemented in the first phases are P.19, P.20 and S.66
- For Transition purpose, it is logical to form a “partnership” operator within the same route
- Pre-requisite for implementation:
  - Station adjustment to allow multiple stops at certain stations
  - Negotiation with operator to discuss the scrapping option
- Estimated time to prepare the implementation: 11 months
  - Communication and negotiation with operators (3 months)
  - Detailed planning, Design, Operator tender and Fleet production (8 months)
  - Planning, design and construction of station (8 months)